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McCabe et al.

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[54] **STETHOSCOPE HEADSET**

[75] Inventors: **John P. McCabe,** Miller Place; **Edwin Joscelyn,** Commack, L. I., both of N.Y.

[73] Assignee: **Instrument Systems Corporation,** Jericho, L. I., N.Y.

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[21] Appl. No.: **212,262**

[52] **U.S. Cl.** ..... **179/1 ST,** 179/1 G, 179/182 R

[51] **Int. Cl.** **H04r 1/46,** H04r 5/00, H04r 1/10

[58] **Field of Search** ..... 179/1 ST, 107 R, 179/114 R, 115 R, 182 R, 156 R, 156 A, 1 G

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Primary Examiner—William C. Cooper
Assistant Examiner—Douglas W. Olms
Attorney—Alex Friedman et al.

[57] **ABSTRACT**

A stethoscope headset formed from a pair of arcuate housing arm members pivotably coupled at one end thereof. Each of the housing arm members is formed with a chamber adjacent said one end thereof dimensioned for receipt of an electro-acoustic transducer and a channel extending through each of said housing arm members providing communication between said chamber and the other end of said arm members. A sound conducting tube extends at least from said chamber through said channel and projects out of the other end of said arm members, an earplug being mounted on a projecting end of each of said sound conducting tubes.

20 Claims, 15 Drawing Figures

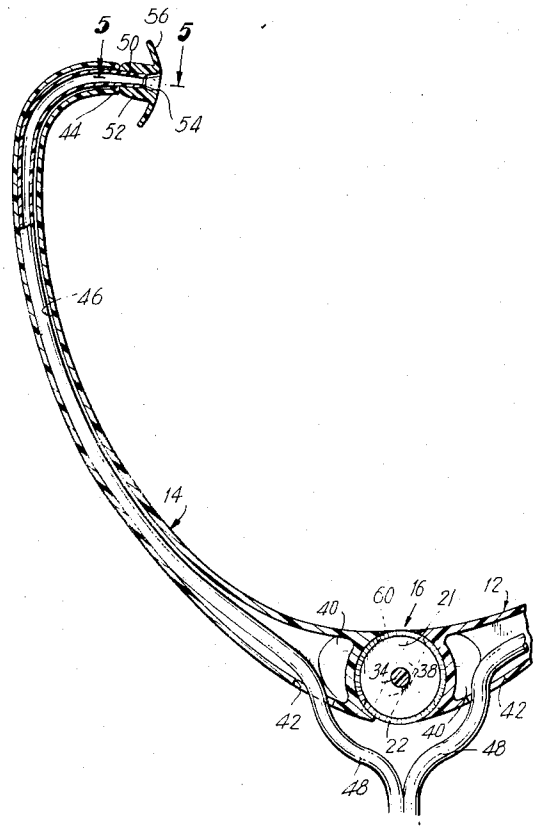
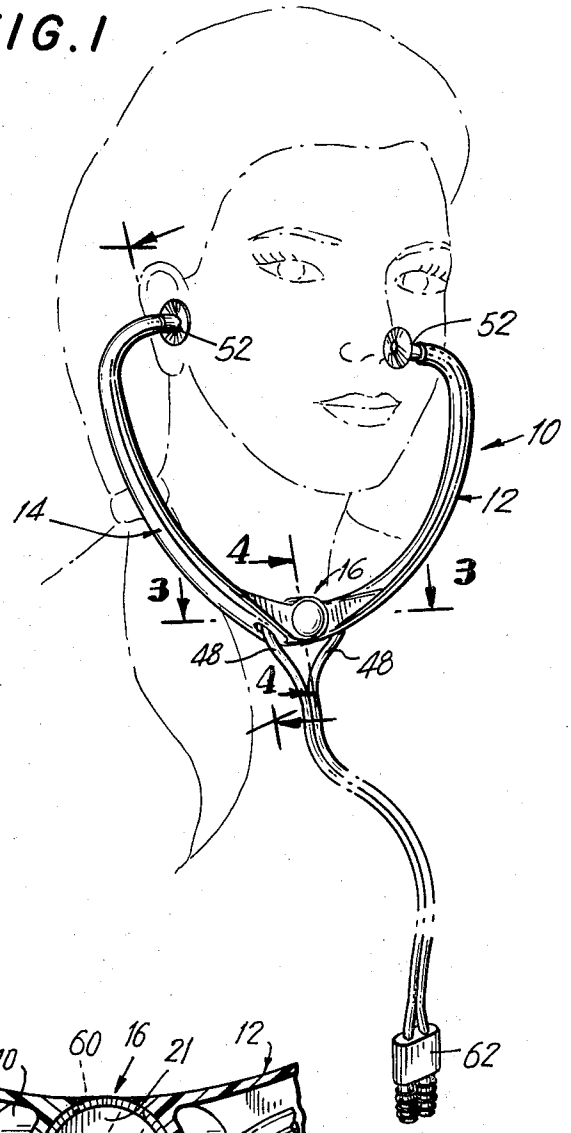


FIG. 1



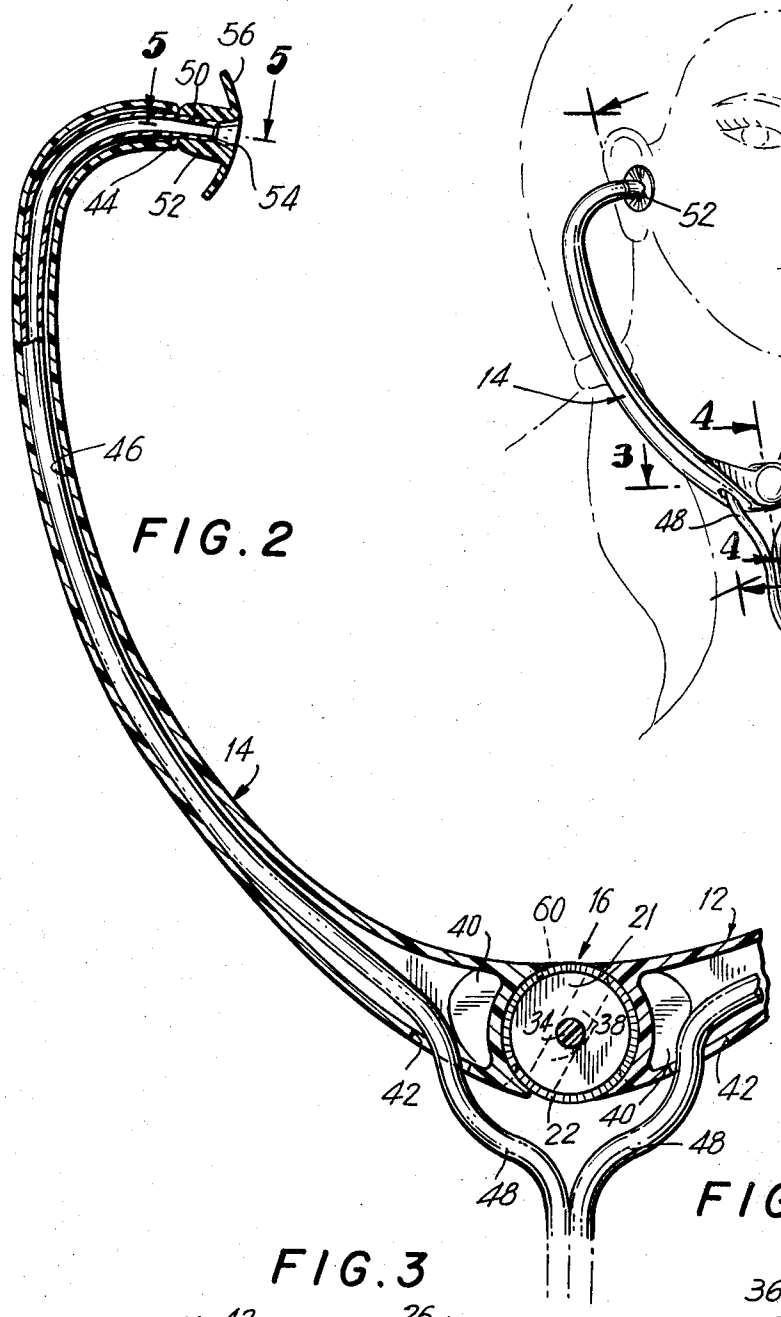


FIG. 2

FIG. 3

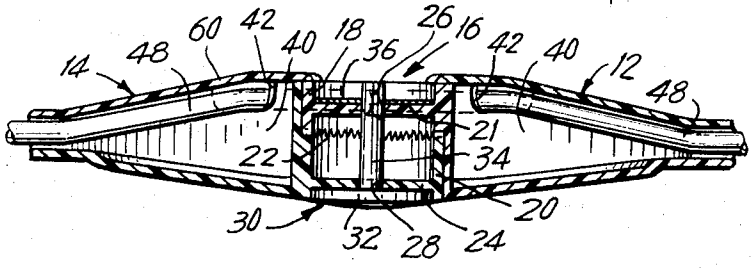
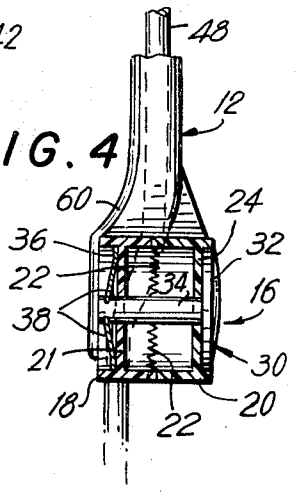


FIG. 4



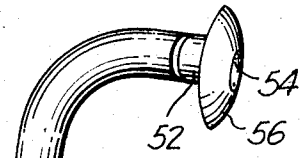
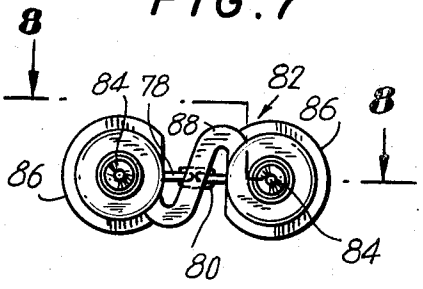


FIG. 6

FIG. 7



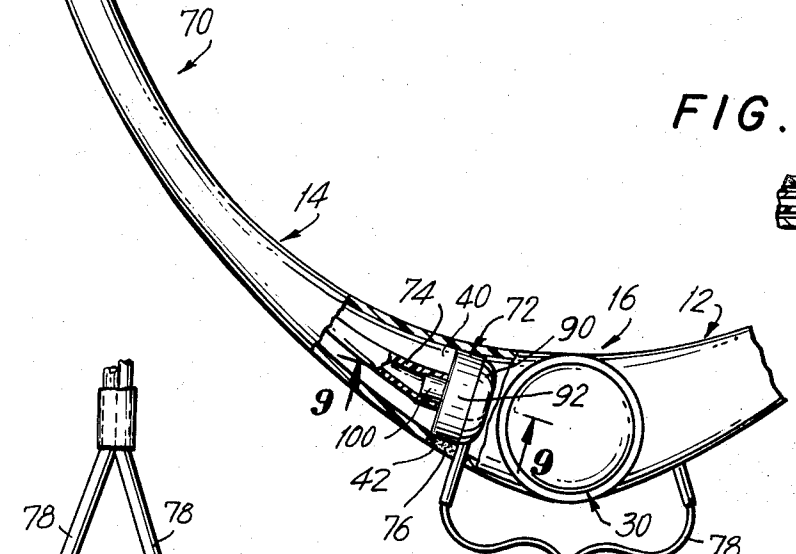


FIG. 5

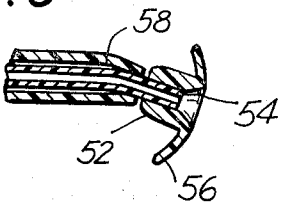


FIG. 8

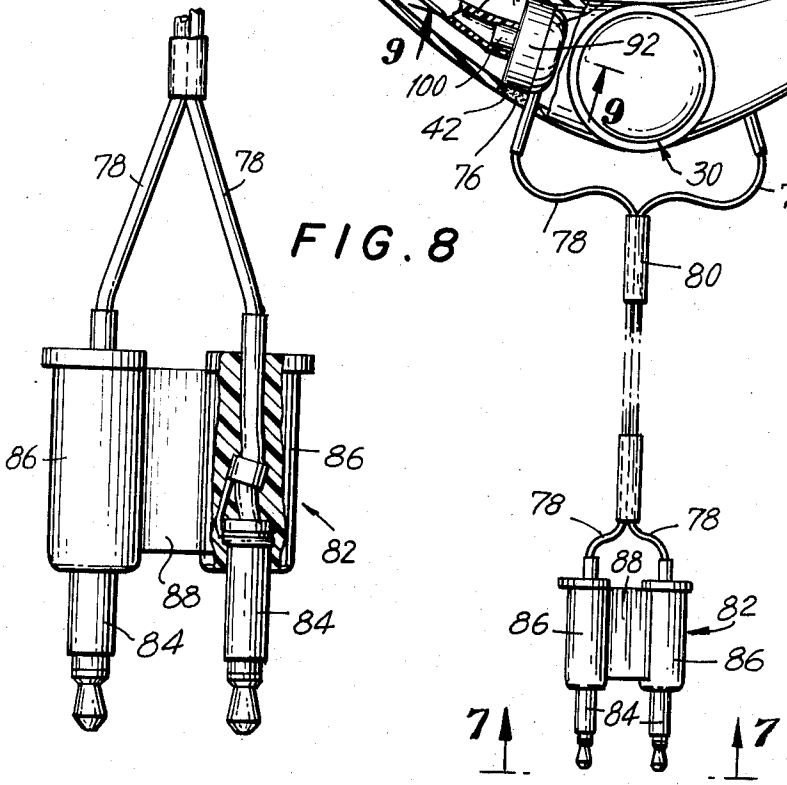


FIG. 9

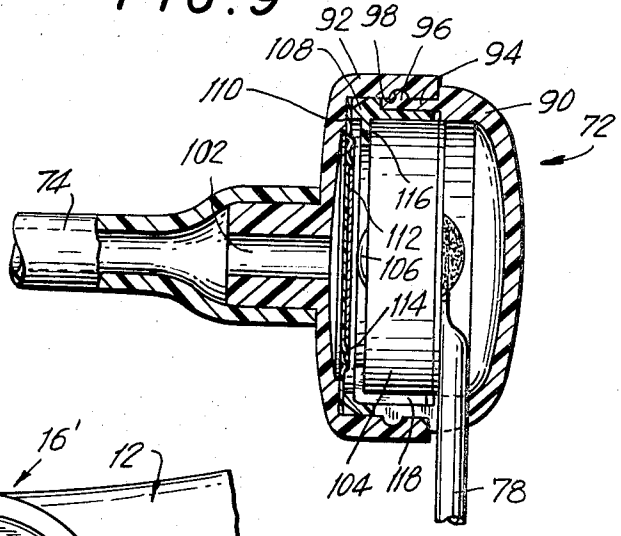


FIG. 10

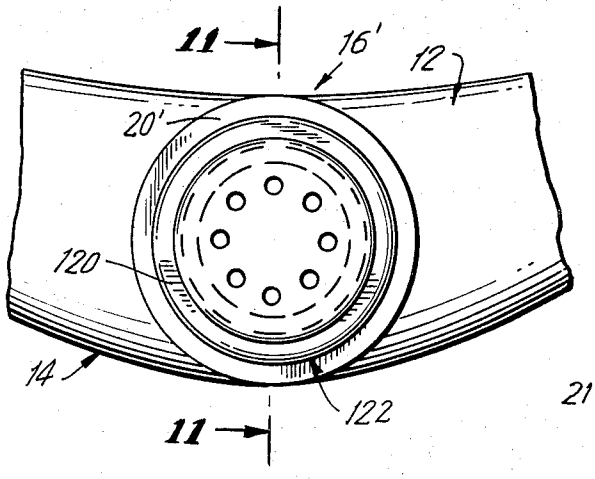


FIG. 11

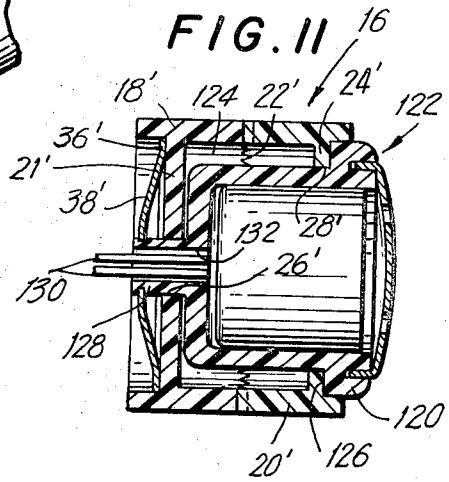


FIG. 12

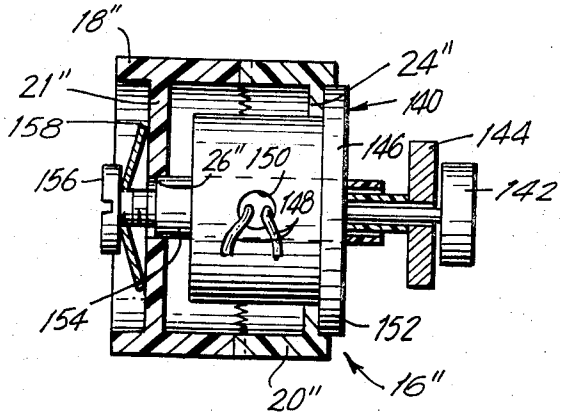


FIG. 13

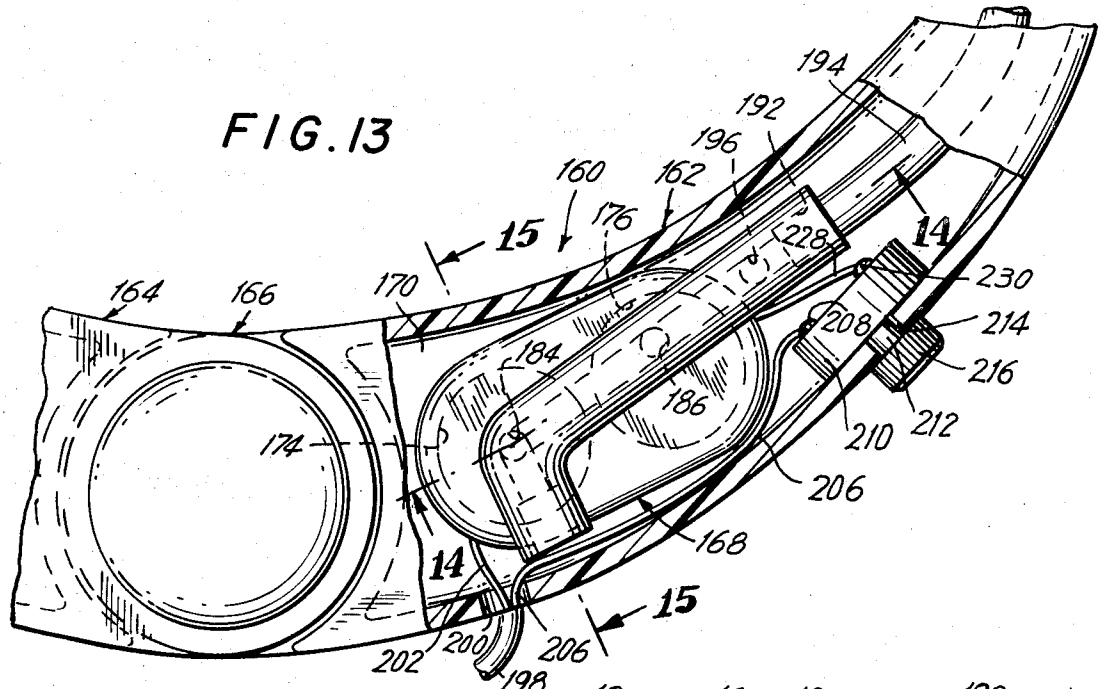


FIG. 14

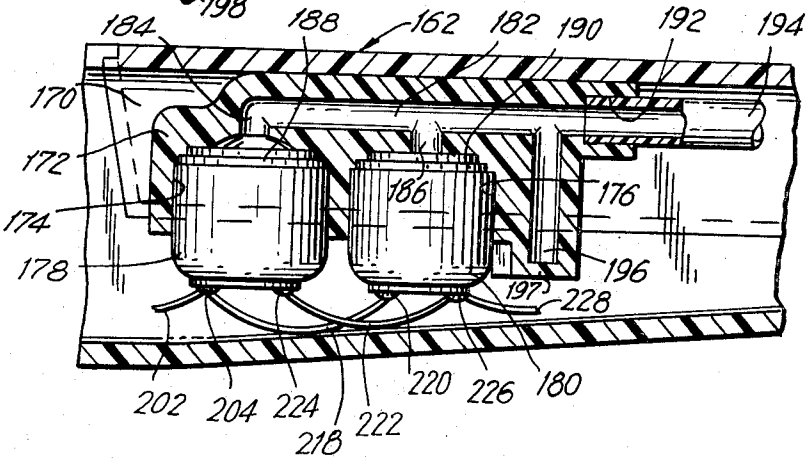
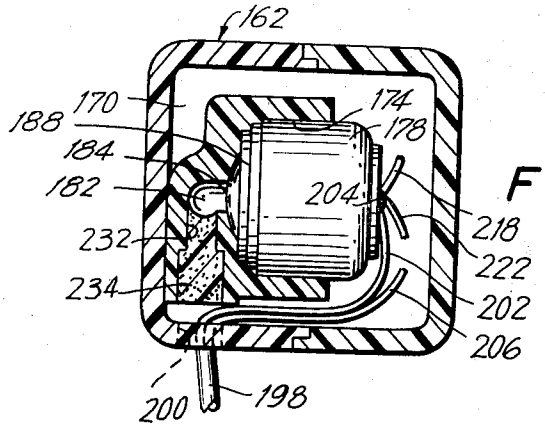


FIG. 15



STETHOSCOPE HEADSET

BACKGROUND OF THE INVENTION

This invention relates to stethoscope headsets of the type distributed by airlines to its passengers in order to permit the private reception by each of said users of the available audio transmission without disturbing the other passengers. Such headsets are not limited to airline applications, but can also be utilized for other purposes wherein the user requires privacy, or wishes to avoid disturbing other individuals in the same area.

The three primary considerations in the design of stethoscope headsets are the fidelity of the transmission of the sound, the comfort of the user, and the cost of manufacture. For airline applications, such headsets must be lightweight and relatively inexpensive, as they are frequently taken away by the passengers. Most modern aircraft are provided with a jack box having a pair of air tube outlets defining the outlet to a pair of electro- acoustic transducers. The conventional stethoscope headsets generally consist of a pair of sound conducting tubes having a jack at one end adapted for engagement in said jack box. Means are generally provided at the other end of said sound conducting tubes for forming said tubes into a stethoscope shape, the end of said tube generally being provided with earplugs for receipt within the ears of the user. The known stethoscope headsets have proved uncomfortable and difficult to adjust, and further, have not provided the desired fidelity of sound transmission.

SUMMARY OF THE INVENTION

Generally speaking, in accordance with the invention, a stethoscope headset is provided having a pair of arcuate housing arm members and is provided coupling said arm members at one end thereof for relative pivotable displacement with the other end thereof in substantially facing relation. Each of said housing arm members is formed with a chamber adjacent said one end thereof dimensioned for receipt of an electro-acoustic transducer and formed with a channel extending from said chamber through said electro-acoustic arm member to said other end thereof. A sound-conducting tube is mounted within each of said channels extending at least from said chamber and projecting from said other end of said housing arm member. An earplug is mounted on the end of each of said sound conducting tubes.

Said housing arm members are each formed with an opening in the wall thereof providing communication to each of said chambers.

The respective coupled ends of said housing arm members are formed with overlapping facing portions, said coupling means including ratchet means for the stepwise relative pivotable displacement of said arm members. Said ratchet means may include teeth projecting from the overlapping facing portions of each of said housing arm members for cooperative engagement therebetween. Said overlapping facing portions may be biased together, and means may be provided for adjusting the force of said bias.

Said sound conducting tubes may project through said chamber and said opening in the wall of the respective housing arm members and may terminate in a jack member. Each of said sound conducting tubes may be coupled to the output of an electro-acoustic transducer mounted within each of said chambers, electrical

lead means being coupled to the input to said electro-acoustic transducer and may extend through said opening in the wall of each of said arm members. The respective lead means may terminate in a common jack member formed from a pair of plug members. Said plug members may be joined by a displaceable wall having a sinuous lateral cross-section for the relative displacement of said plug members.

Said overlapping facing portions of said housing arm members may define a chamber therebetween for receipt of microphone means or volume control means for said electro-acoustic transducers. The end of each of said channels in said housing arm members adjacent said earplugs may be formed to position the projecting end of said sound conducting tubes to direct said end forwardly and downwardly relative to the head of the user.

Said electro-acoustic transducers include a housing, an electro-magnetic transducer mounted within said housing, a diaphragm member positioned adjacent said electro-magnetic transducer in a sound chamber within said housing, said diaphragm being formed from a thin sheet of grain oriented polyester having a metal disc mounted centrally thereon in alignment with the output of said electro-magnetic transducer, said diaphragm being formed with at least one annular convolution therein substantially concentric with said metal disc. The housing is formed with a channel of relatively small cross-section extending from said sound chamber for providing a controlled leak therefrom.

In another embodiment of said transducers, woofer and tweeter transducers are mounted in a housing received within each chamber, said housing having a sound conducting passage communicating with the output of each of said woofer and tweeter transducers, said sound conducting tube being connected between said housing sound conducting passage and said earplugs.

Accordingly, it is an object of this invention to provide a stethoscope headset which is comfortable and is readily adjustable, while providing high fidelity sound transmission.

A further object of the invention is to provide a stethoscope headset housing which may accommodate electro-acoustic transducers, or, in the alternative, merely carry sound conducting tubes.

Still another object of the arrangement according to the invention is to provide a stethoscope headset which is inexpensive to manufacture.

Still a further object of the invention is to provide an improved electro-acoustic transducer.

Still other objects and advantages of the invention will in part be obvious and will in part be apparent from the specification and drawings.

The invention accordingly comprises the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the constructions hereinafter set forth, and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the invention, reference is had to the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a perspective view of one embodiment of the stethoscope headset according to the invention mounted on a user shown in phantom lines;

FIGS. 2, 3 and 4 are cross-sectional views taken along lines 2—2, 3—3, and 4—4 respectively of FIG. 1;

FIG. 5 is a cross-sectional view taken along lines 5—5 of FIG. 2;

FIG. 6 is a fragmentary partially sectioned view of a second embodiment of the stethoscope headset according to the invention;

FIGS. 7 and 9 are cross-sectional views taken along lines 7—7 and 9—9 respectively of FIG. 6;

FIG. 8 is a partially cross-sectioned view taken along lines 8—8 of FIG. 7;

FIG. 10 is a fragmentary front plan view of a third embodiment of the stethoscope headset according to the invention;

FIG. 11 is a sectional view taken along lines 11—11 of FIG. 10;

FIG. 12 is a partially sectional view of a fourth embodiment of the stethoscope headset according to the invention;

FIG. 13 is a fragmentary, partially sectioned front plan view of a fifth embodiment of the stethoscope headset according to the invention; and

FIG. 14 and 15 are sectional views taken along lines 14—14 and 15—15 respectively of FIG. 13.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1–5, the stethoscope headset 10 depicted includes a pair of arcuate housing arm members 12 and 14. Each of said housing arm members are arcuate in shape and are joined at a pivotable coupling 16. As best shown in FIGS. 3 and 4, housing arm members 12 and 14 are provided with substantially annular overlapping end coupling portions 18 and 20 respectively. The respective facing edges of said end coupling portions are in engagement and formed with mating teeth 22 for the stepwise relative positioning of the two housing arm members. End coupling portions 18 and 20 are each formed with laterally extending walls 21 and 24 respectively, bridging the inner periphery of the respective annular coupling end portions. A central aperture 26 is formed in wall 21, while a corresponding aligned aperture 28 is formed in wall 24. A hub member 30 having a head 32 and a post portion 34 projecting axially from said head is provided. Post portion 34 extends through apertures 26 and 28 and serves as the axis of pivoting of the two housing arm members. The head 32 of said hub member rests against wall 24 while the end of post portion 34 thereof is engaged by a spring lock disc 36. Said spring lock disc is formed with a pair of spring fingers 38 which engage against post portion 34 of hub member 30 to retain said hub member and said housing arm members together. Further, said spring fingers serve to provide a resilient bias tending to hold the teeth 22 in respective engagement, while permitting the pivoting of said housing arm members. During said pivotal displacement, end ocupling portions 18 and 20 are displaced relative to each other against the bias force of spring fingers 38 as the respective teeth 22 of end coupling portions 18 and 22 ride one upon the other. If desired, a distinctive logo or other design may be mounted or formed on head 32 of hub member 30.

The housing arm members are formed with a thickened region adjacent the respective end coupling portions defining chambers 40. An aperture 42 is formed in the wall of each of said housing arm members in said thickened region to provide access to chambers 40. As best seen in FIG. 2, the respective thickened regions of housing arm members 12 and 14 serve to limit the pivoting of said housing arm members by engaging at the ends of the desired range of pivoting.

From the thickened region defining chambers 40, each of said housing arm members extends in an arcuate shape to ends 44 thereof which are in substantially facing relation. The length and curvature of each of said housing arm members are dimensioned so as to accommodate the head of the user. The range of relative pivoting of the housing arm members, as determined by the thickened regions thereof, must be adequate to accommodate users of all sizes, including children. The distance between end 44 and pivotable coupling 16 must be such that said pivotable coupling does not engage against the chin of the user at any of the possible relative pivotable positions of said housing arm members.

Housing arm members 12 and 14 are hollow, defining a channel 46 extending from chamber 40 to end 44 thereof. In the embodiment of FIGS. 1 – 5, a sound conducting tube 48 is threaded through the aperture 42, chamber 40, and channel 46 of each of said housing arm members. An end 50 of each of said sound conducting tubes projects out of end 44 of each of said housing arm members. An earplug 52 is mounted on each of said projecting ends 50. Each of said earpieces 52 is provided with a central bore 54 for engagement about the projecting end 50 of a sound conducting tube 48. Said earplug is provided with an annular, deformable, hemispherically shaped flange 56 for engagement in the ear of the user and for providing an air seal between said ear and said earplug. In this manner, the sound waves are transmitted along the sound conducting tube through the end of bore 54 of the earplug into the ear of the user.

As more particularly shown in FIG. 2, the end portion 44 of each of said housing arm members is inclined slightly downwardly toward pivotable coupling 16. Further, as more particularly shown in FIG. 5, the end region 58 of channel 46 adjacent end 44 of each of said housing arm members is inclined in the forward direction so as to direct the projecting end 50 of sound conducting tube 48 in said forwardly direction relative to the user. In this manner, earplug 52 is directed slightly downwardly and forwardly, an angular orientation which is particularly adapted for alignment with the ear canal of the user, and which insures a comfortable, substantially air-tight fit with the user's ear.

One wall of the housing arm members according to the invention in the region of chamber 40 and channel 46 is preferably formed of a separate cover member which permits ready access to said chamber and channel. In the embodiment of FIGS. 1 – 5, said cover member is defined by rear wall 60 which is secured to the balance of the housing arm member by adhesive or the like. The two sound conducting tubes 48 are preferably joined together as a unit after they leave the respective apertures 42 in the housing arm members. Said sound conducting tubes terminate in a jack 62 adapted to plug into a jack box within which is mounted an electro-acoustic transducer. Sound waves generated by said electro-acoustic transducer are transmitted through jack 62, sound conducting tubes 48, and earplugs 52 to the ear of the user.

A second embodiment of the arrangement according to the invention is depicted in FIGS. 6 – 8. Stethoscope headset 70 isprovided with a pair of housing arm members and a pivotable coupling substantially identical to the corresponding components of the embodiment of FIGS. 1 – 5, and like reference numerals have been applied to like structures. Stethoscope headset 70 differs from stethoscoe headset 10 in that an electro-acoustic transducer 72 is mounted within each chamber 40 in place of sound conducting tube 48. A sound conducting tube 74 connects the output of electro-acoustic transducer 72 and earplug 52. Said electro- acoustic transducer is retained in position within housing 40 by an epoxy filler 76. The electrical input to each electro-acoustic transducer is taken along a cable 78, each of which contains two leads. Said cables are joined and supported in a sheath 80, and terminate in a jack 82. As shown in FIG. 8, each of the cables 78 is electrically connected to one of the jack pins 84. The adjacent ends of each of said jack pins and cables are mounted in an insulating body 86. As shown in FIG. 7, the two insulating bodies 86 are joined by a connecting wall 88 having a sinuous cross-section, permitting the relative lateral displacement of the two insulating bodies.

The detailed structure of electro-acoustic transducer 72 is more particularly shown in FIG. 9. Said transducer is provided with a housing consisting of a cover portion 90 and a base portion 92. Cover portion 90 is formed with an annular axially extending flange 94 dimensioned for receipt within base portion 92 and formed with an annular rib 96. The inner surface of base portion 92 is formed with a corresponding annular groove 98 for receiving rib 96 to maintain said cover and base portions of the housing in locking engagement. The base portion of the housing is formed with an axially aligned stub 100 having a bore 102 therethrough providing communication to the inside of said housing. The end of sound conducting tube 74 is received around stub 100 for the transmission of sound waves thereto. Mounted within the housing is an electromagnetic transducer 104 which serves to convert the elctrical audio signal to the oscillations of a magnetic field aligned with pole piece 106. Such electro-acoustic transducer, to which cable 78 is connected, is held within the housing by means of a positioning ring 108. Disc-shaped diaphragm 110 is also positioned and held by positioning ring 108, said diaphragm being positioned intermediate pole piece 106 and bore 102 of stub 100. Said diaphragm is preferably formed of a grain oriented polyester such as Mylar and has a metal disc 112 mounted centrally thereon in facing relation to pole piece 106. Diaphragm 110 is formed with two annular convolutions 114 concentric with an extending about the metal disc 112. The variations in the magnetic field produced in response to the input audio signal causes the vibration of diaphragm 110 due to the cooperation of pole piece 106 and metal disc 112, to produce the sound waves transmitted along sound conducting tube 74 to the ear of the user.

Diaphragm 110 is firmly clamped along its periphery against base portion 92 by positioning ring 108, and is held in place by the engagement of said positioning ring by the end of the annular flange 94 of cover portion 90. The relative spacing between diaphragm 110 and pole piece 106 is maintained by the engagement of the electro-magnetic transducer 104 against an annular flange 116 on positioning ring 108. A portion of said positioning ring is provided with an axially extending slot 118 which provides communication between the region intermediate the diaphragm and the electro-magnetic transducer and the region intermediate said electro-magnetic transducer and cover portion 90. This slot, which is of relatively small dimensions provides a controlled leak in the air chamber of the diaphragm which serves to improve the low frequency response of the electro-acoustic transducer. It is noted that the convolutions 114 in diaphragm 110 also serves to improve the frequency response of the transducer. It has also been found that the inner diameter of sound conducting tube 74 contributes to the frequency response of the arrangement. Thus, it has been found that optimum results are obtained where said inner diameter lies in the range of 0.075 – 0.11 inch.

Because the stethoscope headset embodiment of FIGS. 6 – 8 utilizes a substantially shorter sound conducting tube, and therefore involves substantially lower transmission losses than the embodiment of FIGS. 1 – 5, the former embodiment provides greater fidelity in sound transmission, while still providing a relatively inexpensive and compact stethoscope headset.

Referring now to FIGS. 10 and 11, a further embodiment of the arrangement according to the invention is depicted, wherein a microphone is mounted in the pivotable coupling 16'. Except for the detailed structure of the pivotable coupling, the embodiment of FIGS. 10 and 11 is substantially identical to the embodi- ment of FIGS. 1 – 5 or the embodiment of FIGS. 6 – 8. Pivotable coupling 16' incorporates an end coupling portion 18' forming a part of housing arm member 12' and an end coupling portion 20' forming a part of housing arm member 14'. End coupling portion 18' is substantially identical to end coupling portion 18 of the embodiment of FIGS. 1 – 5, being formed with the teeth 22', in meshing engagement with the corresponding teeth on end coupling portion 20' and wall 21' having aperture 26' therethrough. End coupling portion 20' is formed with a transverse wall 24' but the aperture 28' therein is of substantially larger diameter in order to accommodate the housing 120 of a microphone 122. Said microphone is received within the cavity 124 defined between walls 21' and 24'. Housing 120 is formed with a peripheral flange 126 which engages against the outer surface of wall 24'. Said housing is also provided with a stub 128 which projects through aperture 26' and is engaged by the spring fingers 38' of spring lock disc 36', in much the same manner as post portion 34 is engaged by the corresponding structure in stethoscope headset 10. The electrical leads 130 providing the output of microphone 122 extend through a central bore 132 in stub 128 and would be coupled by a suitable jack to any desired input. The microphone is positioned immediately below the chin of the user, at which position it can receive and transmit conversations of said user.

Still another embodiment of the pivotable coupling is depicted in FIG. 12. In said embodiment, pivotable coupling 16'' has a potentiometer 140 mounted in the cavity defined between walls 21'' and 24'' of end coupling portions 18'' and 20'' respectively. Potentiometer 140 is provided with a pair of separate controls 142 and 144 controlling separate potentiometer windings. Each of said windings is provided with a separate set of leads which extend through an aperture in housing 146 of said potentiometer. Only one of said set of

leads 148 and one of said apertures 150 are depicted in FIG. 12, the other of said set of leads being on the opposed side of said potentiometer. Suitable slots and apertures (not shown) would be formed in the annular end coupling portions 18'' and 20'', and in the wall of the corresponding housing arm members providing access for leads 146 into the respective chambers 40. In this manner, each of the potentiometer winds would be connected to one of the electro-acoustic transducers 72 for the separate control of the volume thereof.

Housing 146 is provided with an annular flange 152 which engages against the outer surface of wall 24'', and is provided with a stub 154 which extends into aperture 26'' in wall 21''. Unlike the above-described embodiments, potentiometer 140 is held in place by means of a bolt 156 threadable received in stub 154 and serving to engage and bias spring washer 158 against wall 21''. This mounting method could be utilized in any of the embodiments of FIGS. 1 – 11.

Referring now to FIGS. 13–15, a further embodiment of the arrangement according to the invention is depicted, wherein stethoscope headset 170 is provided with a pair of housing arm members 162 and 164 and a pivotable coupling 166 substantially identical to the corresponding components of the embodiment of FIGS. 1 – 5. Stethoscope headset 160 differs from stethoscope headsets 10 and 70 in that an electro-acoustic transducer assembly 168 is received within the chamber 170 defined by each of said housing arm members. Transducer assembly 168 consists of a housing 172 formed with a pair of cylindrical recesses 174 and 176 within which are mounted a woofer electr0-acoustic transducer 178 and a tweeter electro-acoustic transducer 180 respectively.

Housing 172 is formed with a sound conducting passage 182 having laterally extending branches 184 and 186 providing communication to cylindrical recessess 174 and 176 respectively. The outputs 188 and 190 of transducers 178 and 180 respectively are positioned to apply the acoustic output signal of said transducers to said branches, and therefore to sound conducting channel 182. Said sound conducting channel is formed with a widened region 192 defining the outlet end thereof, and dimensioned to receive one end of a sound conducting tube 194, the other end of said sound conducting tube being connected to an earplug (not shown).

A further transverse branch 196 extends from housing 172, terminating in end wall 197. Branch 196 serves as a tuning port for smoothing the response versus frequency characteristics of the combined outputs of the woofer and tweeter transducers. In one embodiment, said tuning port is tuned for about 7,000 Hz. By careful selection of the woofer and tweeter transducers and design of the tuning port, the desired characteristics of the signal applied to sound conducting tube 194 can be achieved. Such desirable characteristics require accentuating the low frequencies, so that, starting at about 200 Hz, the response vs. frequency characteristic rolls off at about 3 to 6 db per octive. To this end, the relative impedances of the woofer and tweeter are matched, taking into consideration the relative efficiencies of said woofer and tweeter transducers, so that the woofer predominates, and so that the combination of the woofer and tweeter have a suitable input impedance. The electrical input to said transducers is obtained from cable 198 which passes through aperture 200 in housing arm member 162. Cable 198 consists of a lead 202 which is connected to input terminal 204 of woofer transducer 178 and lead 206 connected to a terminal 208 of a potentiometer 210. Said potentiometer serves as a volume control, and is mounted within chamber 170 and formed with a rotatable control shaft 212 projecting through an operture 214 in housing arm member 162. A knob 216 is mounted on the end of control shaft 212 to permit the adjustment and setting of potentiometer 210. The woofer and tweeter transducers 178 and 180 are connected in parallel, with lead 218 connecting terminal 204 of transducer 178 with terminal 220 of transducer 180, and lead 222 connecting terminal 224 of transducer 178 with terminal 226. Finally, a lead 228 interconnects terminal 226 of transducer 180 with terminal 230 of potentiometer 210.

As more particularly shown in FIG. 15, still a further transverse branch 232 coupling end chamber 170 in the region of opening 200 in housing arm member 162 is also provided. In the embodiment depicted in the drawings, said further branch 232 is blocked by, for example, an epoxy 234. Where it is desired to mix the output of the left and right transducer assemblies according to the invention, one of said assemblies being mounted in each of the housing arm members 162 and 164, branch 232 could be left open, and a sound conducting tube could be provided coupling the branch 232 of each of the transducer assemblies 168, said sound conducting tubes extending through the respective openings 200 in the housing arm members 162 and 164. Such an arrangement would provide not only for the mixing of the signals directed to the left and right ears of the user, but also would provide for a delay in one of the mixed signals which creates a three dimensional stereophonic effect.

Means, such as projections and/or epoxy could be provided for positioning and retaining each transducer assembly 168 and potentiometer 210.

It will thus be seen that the objects set forth above, and those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above constructions without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. A stethoscope headset comprising a pair of arcuate rigid housing arm members, each of said housing arms members being formed at one end thereof with an end coupling portion positioned in overlapping facing relation with the end coupling portion of the other of said housing arm members, each of said housing arm members being formed with a thickened region adjacent said end coupling portion defining a chamber, a wall of said thickened region being formed with an aperture therethrough providing access to said chamber from outside of said housing arm members, each of said housing arm members being further formed with a channel therethrough extending from said chamber to the other end thereof; means coupling the respective end coupling portions of said housing arm members for relative pivotable displacement with said other end of

said housing arm members in substantial facing relation; said coupling means including ratchet means mounted for cooperative engagement on each of said end coupling portions for the stepwise relative pivotable displacement of said arm members; a flexible sound-conducting tube mounted within each of said channels extending from at least said chamber and projecting from said other end of said housing arm member, each of said housing arm members being formed so that the regions of each of said channels adjacent the ends of said housing arm members spaced from said end coupling portions are shaped so as to incline the projecting ends of said sound conducting tubes forwardly from the plane of the headset relative to the head of the user of said headset; and earplug means mounted on said projecting end of each of said sound conducting tubes.

2. A stethoscope headset as recited in claim 1, wherein said ratchet means includes teeth projecting from each of said overlapping facing portions and means for biasing said teeth in cooperative engagement.

3. A stethoscope headset as recited in claim 1, wherein the ends of each of said housing arm members spaced from said end coupling portions are inclined toward said end coupling portions so that said projecting ends of said sound conducting tubes incline downwardly and forwardly relative to the head of the user of said headset.

4. A stethoscope headset as recited in claim 1, wherein each of said sound conducting tubes extend through said chamber and said aperture in said thickened region of its respective housing arm member; and jack means coupled to the respective ends of said sound conducting tubes projecting outside of said housing arm members through said apertures.

5. A stethoscope headset as recited in claim 1, including an electro-acoustic transducer means positioned in each of said chambers, said sound conducting tube being coupled to the output of said transducer means; and lead means coupled to the input of said transducer means and extending out of each said housing arm member through said aperture in said thickened region thereof.

6. A stethoscope headset as recited in claim 5, wherein said sound conducting tube is formed with an inner diameter of about 0.075 – 0.11 inch.

7. A stethoscope headset as recited in claim 5, including jack means coupled to the lead means associated with each of said transducers, said jack means including a pair of jack pins, one of said pins being coupled to each of said lead means, insulating body means encapsulating adjacent portions of each of said jack pins and lead means, and connecting wall means, said connecting wall means having a sinuous transverse cross-section for permitting the relative transverse displacement of said pin jacks.

8. A stethoscope headset as recited in claim 5, wherein said electro-acoustic transducer means includes a housing having an aperture therethrough defining said transducer output; an electromagnetic transducer mounted within said housing and having an axial pole piece defining the output thereof; a diaphragm member positioned intermediate said transducer output and said electromagnetic transducer, said diaphragm member being formed from a thin sheet of grain oriented polyester having a thin metal disc mounted centrally thereon in substantial alignment with said pole piece, said diaphragm member having at least one annular ridge formed by said thin sheet substantially concentric with said metal disc; and positioning ring means mounted within said housing for positioning said diaphragm member and electro-magnetic transducer in spaced relation within said housing.

9. A stethoscope headset as recited in claim 8, wherein said positioning ring means is formed with a channel of relatively small cross-section extending from the region intermediate said electro-magnetic transducer and said diaphragm member to the region within said housing on the opposed side of said electromagnetic transducer for providing a controlled leak from said first-mentioned region.

10. A stethoscope headset as recited in claim 8, wherein said diaphragm member is formed with two of said annular concentric ridges.

11. A stethoscope headset as recited in claim 5, wherein said electro-acoustic transducer means includes a housing formed with a sound-conducting passage extending to the outside of said housing and defining thereat the output of said transducer means; a woofer electro-acoustic transducer mounted in said housing and having an outlet positioned for applying an acoustic signal to said sound-conducting passage; a tweeter electro-acoustic transducer mounted within said housing and having an output positioned for application of an acoustic signal to said sound-conducting passage; said lead means connecting said woofer and tweeter electro-acoustic transducers in parallel at their respective inputs.

12. A stethoscope headset as recited in claim 11, wherein said housing is formed with a transverse bore providing communication between said sound-conducting passage and the outside of said housing, said bore being dimensioned to define a tuning port for substantially smoothing the response versus frequency characteristics of said transducer means.

13. A stethoscope headset as recited in claim 12, wherein said transverse bore, and said woofer and tweeter electro-acoustic transducers being selected so as to provide a respeonse versus frequency characteristics which rolls off at about 3 to 6 db per octive from about 200 Hz.

14. A stehtoscope headset as recited in claim 11, wherein said housing is formed with a bore interconnecting said soundconducting passage and the outside of said housing, said bore being adapted to receive a sound-conducting tube for the application of a further audio signal to said transducer means.

15. A stethoscope headset as recited in claim 5, including potentiometer means mounted within each of said chambers, each of said housing arm members being formed with a further aperture therethrough in the region of its respective chamber, said potentiometer means being formed with manual adjusting means extending through said further aperture, said lead means coupling said transducer means and said potentiometer means in series for the manual adjustment of the volume of the audio output of said transducer means.

16. A stethoscope headset as recited in claim 1, wherein one of said end coupling portions is formed with a first transverse wall and the other of said end coupling portions is formed with a second transverse wall in overlapping spaced relation to said first trans-

verse wall, said first transverse wall having an aperture therethrough; and including microphone means positioned in the space between said first and second transverse walls and having an input face projecting through said aperture in said first transverse wall.

17. A stethoscope headset as recited in claim **16,** wherein said second transverse wall is formed with an aperture therethrough, said microphone means having a housing formed with a radial flange dimensioned for engagement against the outer surface of said first transverse wall, said microphone means housing also being formed with a projecting stub extending through said aperture in said second transverse wall, said coupling means including means for engaging said stub and said second transverse wall for retaining said housing arm members in pivotable coupling with said microphone means housing serving as the axis of pivoting thereof.

18. A stethoscope headset as recited in claim **5,** wherein one of said end coupling portions is formed with a first transverse wall having an aperture therethrough, the other of said end coupling portions being formed with a second transverse wall in spaced overlapping relation to said first transverse wall; and including potentiometer means positioned within the space between said first and second transverse walls and having control means projecting through said aperture in said first transverse wall; and lead means operatively coupling said potentiometer means with each of said electro-acoustic transducers for the control of the signal applied thereto.

19. A stethoscope headset as recited in claim **18,** wherein said potentiometer means includes two separate potentiometer winding means, said control means including two separate controls, one of said separate controls being operatively coupled to each of said potentiometer winding means.

20. A stethoscope headset as recited in claim **18,** wherein said second transverse wall is formed with an aperture therethrough, said potentiometer means including a housing formed with a radial flange positioned for engagement with the outer surface of said first transverse wall, said potentiometer means housing being formed with a projecting stub extending through said aperture in said second transverse wall, said coupling means including means for engaging said stub and said second transverse wall for coupling said housing arm members together with said potentiometer means housing defining the axis of pivoting thereof.

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